

ABSTRACT OF THE DISCLOSURE

An aluminum-containing material deposition method includes depositing a first precursor on a substrate in the substantial absence of a second precursor. The first precursor can contain a chelate of $\text{Al}(\text{NR}^1\text{R}^2)_x(\text{NR}^3(\text{CH}_2)_z\text{NR}^4\text{R}^5)_y$ or $\text{Al}(\text{NR}^1\text{R}^2)_x(\text{NR}^3(\text{CH}_2)_z\text{OR}^4)_y$; where x is 0, 1, or 2; y is 3 - x ; z is an integer 2 to 8; and R_1 to R_5 are independently selected from among hydrocarbyl groups containing 1 to 10 carbon atoms with silicon optionally substituted for one or more carbon atoms. The method includes depositing the second precursor on the first deposited precursor, the second precursor containing a nitrogen source or an oxidant. A deposition product of the first and second precursors includes at least one of an aluminum nitride or an aluminum oxide. The deposition method can be atomic layer deposition where the first and second precursors are chemisorbed or reacted as monolayers. The first precursor can further be non-pyrophoric.